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DOCUMENT TITLE CLEANING AND CLEANLINESS CONTROL FOR FIELD MODIFICATIONS OF VESSEL COMPONENTS

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DESCRIPTION OF GROUPS | PRINTS TO

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TITLE
CLEANING AND CLEANLINESS CONTROL FOR FIELD MODIFICATIONS OF VESSEL COMPONENTS

1. SCOPE

1.1 This specification defines the requirements for cleaning and cleanliness control for field modifications of vessel components.

2. APPLICABLE DOCUMENTS, CODES, AND STANDARDS

2.1 The following documents, codes, and standards form a part of this specification to the extent specified herein.

2.2 General Electric Company Documents

2.2.1 Reference Documents. Reference documents are those documents that fulfill functions not directly affecting the Construction of a component or appurtenance. Reference documents to this document follow:

2.2.2.1 Reference Specifications

a. Thread Lubricant - D50YP2

b. Thread Lubricant - D50YP5A or B

3. DESCRIPTION

3.1 The cleanliness objective for field modification of vessel components is to perform the work in such a manner so as to be clean at the end of assembly with no need for final cleaning.

4. REQUIREMENTS

4.1 General

4.1.1 Approvals. Where approvals are required by this document, approval shall be obtained from the responsible General Electric Design Engineering unit.

4.1.2 Quality for Cleaning Water The following requirements shall apply to water used for cleaning.

4.1.2 (Continued)

Demineralized Water	
	Maximum or Range
pH @ 25°C (77°F)	5.5 to 8.0
Chloride ppm	1.0
Fluoride ppm	1.0
Sulfide ppm	1.0
Conductivity @ 25°C, μmho/cm	3.0
Silica ppm	0.05
Turbidity	1 Jackson Turbidity Unit

4.1.3 Inhibited Water. Inhibited water shall be water to which a minimum of 500 ppm of phosphate has been added as reagent grade TSP. The final solution shall contain a minimum of 500 ppm phosphate and shall contain no more than 100 ppm of chlorides.

4.1.4 Treatment of Sensitized Stainless Steel. All water contacting nitrided materials shall be inhibited water in accordance with Paragraph 4.1.3.

4.2 Frequency of Cleaning

4.2.1 Cleanliness of stainless steel and Ni-Cr-Fe materials shall be controlled so that surfaces are visibly free of the miscellaneous materials and other contaminants listed in Paragraph 4.4 prior to any of the following operations:

a) Assembly such that surfaces are no longer accessible for cleaning.

b) Welding. Surfaces for a minimum distance of 1 inch from the weld shall be clean except that anti-spatter compounds may be applied up to the weld edge when approved providing that test work is performed to demonstrate that material properties are not detrimentally affected.

c) Wetting of Surfaces. Stainless steel and Ni-Cr-Fe surfaces shall be visibly clean prior to being wet except for cleaning solutions.

4.3 Storage

4.3.1 During storage stainless steel and Ni-Cr-Fe parts shall be protected from exposure to harmful materials and shall be kept visibly clean and dry.

4.4 Contaminants and Miscellaneous Process Materials

4.4.1 Miscellaneous Materials. All materials which are applied or which contact stainless steel and Ni-Cr-Fe shall be from the following list or shall alternately be submitted for approval.

a. Water. All water shall be demineralized water.

b. Liquid penetrant materials. As approved in the procedure

c. Cleaning solvents shall be in accordance with Paragraph 4.5.3 and 4.5.4.

d. Marking materials. Graphite lead pencils, ballpoint pen, and Carters Ink Company "Marks-A-Lot" tipped markers.

e. Layout Fluid. Dykem Company - Dykem Steel blue, DX-100, Sprayon Products, Inc. - Sprayon number 603

f. Pressure sensitive tape - Nashua Corporation, Dutch Brand, number 357 (silver only), Trantex E12; Kendall Corporation, Polyken, number 222; 3M Company, Numbers: 480, and 850.

g. Lubricants. Thread Lubricant D50YP2 or D50YP5A or B. D50YP5A shall only be used where essentially all of it will be removed prior to final assembly.

4.4.2 Typical Assembly Debris which require periodic cleanup are grinding dust, weld spatter, weld flux, flux fumes, anti-spatter compound, dye penetrant materials.

4.5 Cleaning Methods

4.5.1 The cleaning processes which follow are acceptable and other methods shall not be used unless approved.

4.5.2 General

4.5.2.1 Cleaning Solutions. The temperature of cleaning or flushing solutions shall not exceed 200°F. Cleaning solutions shall not contain more than 100 ppm of chlorides.

4.5.2.2 Mechanical methods. When mechanical methods are used, precautions shall be taken to assure that particulate matter will not drop into areas inaccessible for cleaning. The following methods may be used with the listed precautionary requirements.

a) De-slagging Hammers. Hammers shall only be used within the welding groove and shall not be used on the final surface of the material.

4.5.2.2 (Continued)

b) Wire Brushing. For use on stainless steel and Ni-Cr-Fe, wire brushes shall be stainless steel not previously used on other materials. Either power or hand brushing is acceptable. Power wire brushing shall not preceed an acceptance liquid penetrant examination unless approved. Approval shall be based on an acceptable demonstration that the type of brush and motor unit to be used does not close defects.

c) Grinding, Filing, Sweeping, Vacuuming and Air Blowing. Air shall be free of oil. All tools including grinding wheels and files shall be clean prior to use. Abusive grinding where high heat is generated is prohibited.

4.5.3 Water Cleaning. High, and low-pressure water blasting, and water flushing may be used to clean parts and structures providing the following conditions are met:

a) Water shall be in accordance with Paragraph 4.1.

b) Sodium phosphate may be added to the water, if desired. No other additives shall be used unless approved. Where sodium phosphate has been used controls shall be effected to assure removal of the phosphate prior to welding.

c) The component part of structure shall be dried as soon as practical after the wetting operation. Drying may be accomplished by allowing the part to drain. Areas which will not drain dry shall be dried by wiping with clean cloths, or blowing with oil-free air either heated or ambient.

4.5.4 Solvent Degreasing. Cleaning of acessible surfaces may be accomplished using the following listed solvents. Solvents, other than those listed, shall not be used.

a) Acetone. Technical grade, new or redistilled (Acetone reclaimed by other methods shall not be used).

b) Alcohol. Isopropyl or otherwise denatured, technical grade alcohol.

c) Toluol. Toluol or toluene technical grade. This solvent will remove some tape residues which are not soluble in acetone.

4.5.5 Acid and Chelate Cleaning. No acid or chelate cleaning shall be used unless approved for the specific application.

4.5.6 Alkaline Cleaning. Cleaning solutions which contain free caustic (either sodium hydroxide or potassium hydroxide) shall not be used. Tri- Sodium Phosphate Cleaning may be used.

a) Parts may be swab cleaned with hot or cold solutions of tri-sodium phosphate. Phosphate shall be removed from surfaces by rinsing with water after cleaning has been accomplished.

4.5.7 Detergent Cleaning. Detergent cleaning shall require specific approval.

4.6 Cleanliness Control During Reactor Assembly

4.6.1 Inspection of Items for Installation. All incoming items shall be inspected on arrival for condition of the parts and/or its packaging. If the container or packaging is found to be in good condition, inspection of the contents may be done at a later time when they are unpacked for assembly.

4.6.1.1 All internals for the reactor vessel shall be inspected for cleanliness and cleaned, if necessary, prior to installation in the vessel.

4.6.2 Vessel Access. Personnel, tools, and equipment entering the vessel shall be controlled by a log or register system.

4.6.3 Cleanliness During Assembly. Positive means shall be provided for preventing weld slag, spatter, electrode stubs, tools, dirt, grinding dust, and other such items from entering cleaned areas or from entering areas inaccessible for cleaning.

4.6.3.1 Crevices within six inches of flux welding shall be covered to prevent deposition of fumes.

4.6.3.2 The work area inside the reactor vessel shall receive periodic cleaning so that the soils produced during the assembly operation are not allowed to accumulate. Effort shall be made to localize the soils produced. Cleaning shall include, as a minimum, the removal of all debris and contaminants; a thorough vacuum cleaning of all surfaces in the immediate work area including all non-portable tools and construction equipment, and if required for removal of oil, a wipe down with clean, lint-free cloths using an approved solvent.

4.6.3.3 As work is completed in specific areas, such areas shall be sealed after final cleaning when feasible. The method of sealing shall be able to withstand the affects of welding and grinding above them and of personnel passage through them, if required.

5. FINAL CLEANING AND ACCEPTANCE CRITERIA

5.1 Final Cleaning. After assembly has been completed, the modified components shall be visibly free of all soils, miscellaneous materials and other foreign materials. Slight surface marking due to water evaporation and/or a light coating of phosphate is permissible.

6. SUBMITTALS

6.1 General

6.1.1 Submittal requirements shall apply to the Installer and to the Installer's subcontractors. The Installer shall be responsible for all submittals including those of the Installer's subcontractors. If any changes are made either by the authority in Paragraph 4.1.1 or by the Installer to the submittals, a new revision shall be sent by the Installer.

6.2 Procedures and Documents

6.2.1 The following items shall be submitted for approval.

a. List of any miscellaneous materials to be used which are not included in this specification.

b. Methods of cleaning and keeping clean during assembly. Included would be any cleaning procedures, mechanical or otherwise, and cleaning prohibitions.